WHAT IS CLAIMED IS:

1. A beam-steering device comprising:

a carriage adapted to rotate about a first axis, said carriage having an inboard region and an outboard aperture;

an upper off-axis parabolic reflector adapted to receive or reflect a beam directed generally along said first axis and receive or reflect the beam in a generally radial direction generally orthogonal to the first axis;

a right-angle reflector radially offset from said upper reflector and adapted to receive or reflect the beam in a generally radial direction to or from said upper reflector and receive or reflect the beam in a generally axially direction which is radially offset from said first axis;

a lower off-axis parabolic reflector adapted to receive or reflect the beam to or from said right angle reflector and to receive or reflect the beam in a radially direction generally through and orthogonal to the first axis, said lower reflector positioned axially adjacent said right angle reflector such that the primary optical axis of the beam intersects an on-axis focus point of said lower reflector; and

a mirror and one-axis gimbal assembly positioned 180 degrees radially opposite said lower reflector and adapted to rotate about a second axis being radially offset from and orthogonal to the first axis, said mirror adapted to receive or reflect beams radially reflected from said lower reflector and to receive or reflect beams through said outboard aperture.

2. The beam-steering device according to Claim 1, wherein said device is totally all reflective.

3. The beam-steering device according to Claim 1, wherein said device is adapted to be installed conformally and flush with the skin of a vehicle.

4. The beam-steering device according to Claim 1, wherein said device achieves a steering field of regard (FOR) of 180° Az and +/- 45° El.

5. The beam-steering device according to Claim 1, wherein said device maintains achromaticity over the range of 1 $\mu m < \lambda < 12\ \mu m$.

6. The beam-steering device according to Claim 1, wherein when the beam is transmitted from said device, maintenance of both coherence and phase across the wavefront is achieved.

7. The beam-steering device according to Claim 1, said carriage comprising a cylindrically-shaped body and a retaining base which is adapted to rotatably receive and retain said cylindrically-shaped body.

8. The beam-steering device according to Claim 7, said retaining base adapted to be rigidly mounted to a vehicle structure.

9. The beam-steering device according to Claim 8, further comprising an exit pupil window securedly attached to the retaining base of said rotating carriage.

10. The beam-steering device according to Claim 1, wherein said one-axis gimbal assembly steers only over 0-45 degrees El.

11. The beam-steering device according to Claim 1, wherein the initial diameter of the beam is telescopically magnified to a final diameter d_f.

12. The beam-steering device according to Claim 11, the final diameter d_f being between about 30- 50 mm depending on the mission.

13. The beam-steering device according Claim 11, wherein the telescopic magnification occurs between the upper reflector and the lower reflector.

14. The beam-steering device according to Claim 1, wherein a mechanical range of motion θ of said mirror about a tilt axis of said one-axis gimbal assembly is about 0 – 22.5 degrees.

15. The beam-steering device according to Claim 14, wherein an optical steering range α of 0 – 45 El degrees is produced.

16. The beam-steering device according to Claim 1, in combination with a fine-steering element.

17. The beam-steering device according to Claim 1, said outboard aperture having a diameter ranging from about 3 to 4 inches.

18. The beam-steering device according to Claim 1, said carriage adapted to rotate 360 degrees about the first axis in a clockwise and counterclockwise direction.

19. The beam-steering device according to Claim 1, said one-axis gimbal assembly and mirror further outwardly offset a predetermined distance x from the primary optical axis of the beam.

20. The beam-steering device according to Claim 9, said one-axis gimbal having a tilt element centered about the second axis, wherein the second axis is oriented in parallel with respect to said exit pupil window, and further wherein the second axis is positioned substantially proximate an interior surface of said exit pupil in said outboard aperture.

21. The beam-steering device according to Claim 20, said mirror having a lowest edge connected to said tilt element such that said mirror hingedly rotates about said tilt element.

22. A conformal and all-reflective beam-steering device comprising:

a rotating carriage adapted to rotate 360 degrees about a first axis, said carriage having an inboard region and an outboard aperture;

an upper off-axis parabolic reflector having a first concave reflective surface centered about the first axis, said upper reflector adapted to receive or reflect a beam directed generally along said first axis and receive or reflect the beam in a generally radial direction generally orthogonal to the first axis, said upper reflector fixedly attached to a first portion of said inboard region of said rotating carriage;

a right-angle reflector radially offset from said upper reflector and arranged such that a reflector surface of said right angle reflector is centered about and oriented at a 45 degree angle with respect to a primary optical axis of the beam, said right angle reflector adapted to receive or reflect the beam in a generally radial direction to or from said upper reflector and adapted to receive or reflect the beam in a generally axially direction which is radially offset from said first axis, said right angle reflector fixedly attached to a second portion of said inboard region of said rotating carriage;

a lower off-axis parabolic reflector having a second concave reflective surface positioned to receive or reflect the beam to or from said right angle reflector and to receive or reflect the beam in a radially direction generally through and orthogonal to the first axis, said lower reflector positioned axially adjacent said right angle reflector such the primary optical axis of the beam intersects an on-axis focus point of said lower reflector, said lower reflector fixedly attached to a third portion of said inboard region of said rotating carriage; and

a mirror and one-axis gimbal assembly positioned 180 degrees radially opposite said lower reflector and fixedly attached to a fourth portion of said rotating carriage, said mirror assembly adapted to rotate about a second axis being radially offset from and orthogonal to the first axis, and further offset a predetermined distance from the primary optical axis of the beam, said mirror assembly having a tiltable reflective surface oriented to receive or reflect beams radially reflected from said lower reflector and to receive or reflect beams through said outboard aperture.

23. The beam-steering device according to Claim 22, wherein said device is totally all-reflective.

24. The beam-steering device according to Claim 22, wherein said device is adapted to be installed conformally and flush with the skin of a vehicle.

25. The beam-steering device according to Claim 22, wherein said device achieves a steering field of regard (FOR) of 180° Az and +/- 45° El.

26. The beam-steering device according to Claim 22, wherein said device maintains achromaticity over the range of 1 $\mu m < \lambda < 12$ μm.

27. The beam-steering device according to Claim 22, wherein when the beam is transmitted from said device, maintenance of both coherence and phase across the wavefront is achieved.

28. The beam-steering device according to Claim 22, said rotating carriage comprising a cylindrically-shaped body and a retaining base which is adapted to rotatably receive and retain said cylindrically-shaped body.

29. The beam-steering device according to Claim 28, said retaining base adapted to be rigidly mounted to a vehicle structure.

30. The beam-steering device according to Claim 29, further comprising an exit pupil window securedly attached to the retaining base of said rotating carriage.

31. The beam-steering device according to Claim 22, wherein said one-axis gimbal steers only over 0-45 degrees El.

32. The beam-steering device according to Claim 22, wherein the initial diameter of the beam is telescopically magnified to a final diameter d_f.

33. The beam-steering device according to Claim 32, the final diameter d_f being between about 30 mm to 50 mm depending on the mission.

34. The beam-steering device according Claim 32, wherein the telescopic magnification occurs between the upper reflector and the lower reflector.

35. The beam-steering device according to Claim 22, wherein a mechanical range of motion θ of said mirror about a tilt axis of said one-axis gimbal assembly is about 0 – 22.5 degrees.

36. The beam-steering device according to Claim 35, wherein an optical steering range α of 0 – 45 degrees El is produced.

37. The beam-steering device according to Claim 22, in combination with a fine-steering element.

38. The beam-steering device according to Claim 22, said outboard aperture having a diameter ranging from about 3 to 4 inches.

39. The beam-steering device according to Claim 22, said one-axis gimbal assembly and mirror further outwardly offset a predetermined distance x from the primary optical axis of the beam.

40. The beam-steering device according to Claim 28, said one-axis gimbal having a tilt element centered about the second axis, wherein the second axis is oriented in parallel with respect to said exit pupil window, and further wherein the second axis is positioned substantially proximate an interior surface of said exit pupil in said outboard aperture.

41. The beam-steering device according to Claim 40, said mirror having a lowest edge connected to said tilt element such that said mirror hingedly rotates about said tilt element.